Dec. 10, 1940. W. VAN TRIEST 2,224,171

AUTOMATIC FUEL CONTROL FOR SCARFING TORCHES AND THE LIKE

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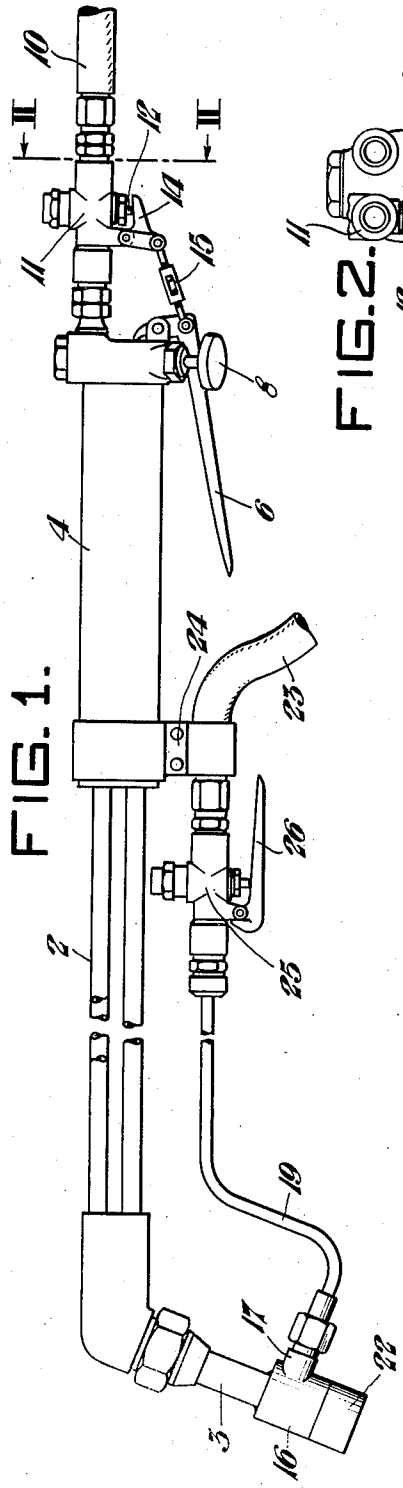


FIG. 1.

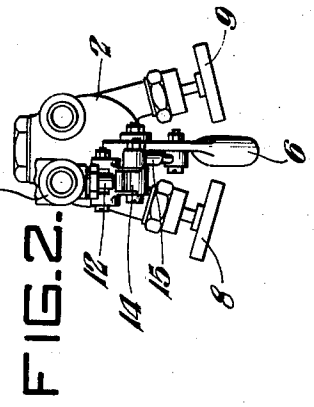


FIG. 2.

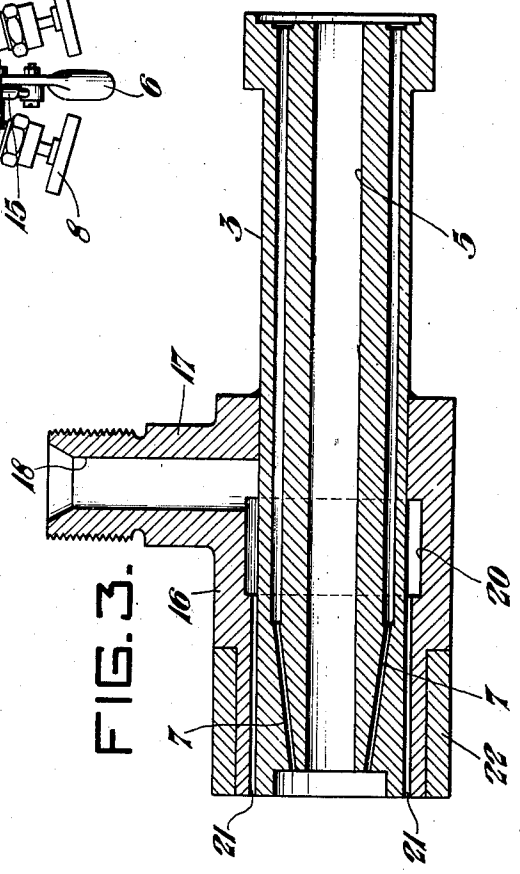


FIG. 3.

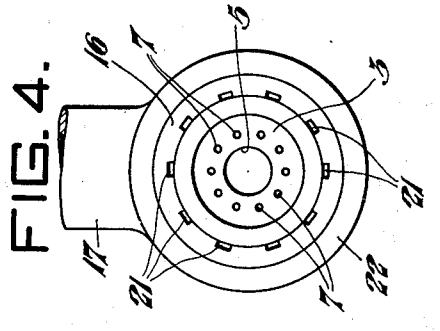


FIG. 4.

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AUTOMATIC FUEL CONTROL FOR SCARFING TORCHES AND THE LIKE

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1 Claim. (Cl. 158—27.4)

The present invention relates to the automatic control of the fuel and oxygen supplied to scarfing torches and the like.

An object of the present invention is to provide automatic means for substantially shutting off the supply of fuel gas when the scarfing oxygen is fed to the torch nozzle and re-establishing said fuel supply when the scarfing oxygen is shut off.

Another object of the present invention resides in maintaining a small amount of fuel gas to provide a pilot flame for the preheat treatment of the metal during the time that the pure oxygen is being fed for the scarfing operation so that upon shutting off of the feed of oxygen, the preheating flame automatically returns to the torch nozzle without further adjustment.

Other objects and advantages will become apparent as the description proceeds and reference is had to the acompanying drawing, in which:

Figure 1 is a side elevation of the embodiment of the control mechanism for the preheating flame in combination with the control mechanism for encircling the oxygen stream;

Figure 2 is a section on line II—II of Figure 1;

Figure 3 is an enlarged detailed section of the attachment to the end of the nozzle; and

Figure 4 is an end view of the fitting attached to the burner nozzle.

In the drawing, a commercial scarfing torch of conventional design is diagrammatically shown at 2. This torch includes a burner tip 3 at one end and a handle 4 at the other end, between which are positioned the conventional tubes for conveying oxygen and fuel gas for the preheating flame and the main supply of oxygen to the burner tip 3 for removal of the surface imperfections in the material being scarfed.

As shown in Figure 3, the large central hole 5 is the passage for the main flow of pure oxygen used for scarfing after preheating of the metal surface has been accomplished. The flow of the pure oxygen through its tube to the burner tip 3 is controlled by the valve lever 6 pivotally supported, in any conventional manner, on the handle 4. Surrounding the large central hole 5 in the burner tip 3, is a circle of small holes or passages 7 serving as ports for passage of the mixture of fuel gas and oxygen used to make up the preheating flame. This mixture of fuel and oxygen passing through the small holes 7 is regulated by adjusting the needle valve wheels diagrammatically shown at 8 and 9, so that the proper mixture may be supplied to the burner tip for preheating the steel prior to the application of the main supply of oxygen passing through the opening 5.

Heretofore, the preheat mixture of fuel gas and oxygen fed to the circle of small holes in the burner tip 3 aforementioned, has been continued while the main scarfing stream of pure oxygen is being supplied through opening 5 so as to have the preheating flame ready for the next cut.

This has been found to be uneconomical and the present invention provides means for overcoming this objection by controlling the fuel supply. There is positioned between the pure oxygen control mechanism and the fuel gas hose connection 10, a spring loaded plunger valve mechanism indicated generally at 11, said spring loaded plunger valve mechanism being of conventional construction and including the valve lifting rod 12 projecting from said plunger valve mechanism 11 to be engaged by the lever arm 14. This lever arm 14 is pivotally connected, in any conventional manner, to the body of the plunger valve mechanism 11 and is likewise pivotally connected to an adjustable mechanism 15 which, for the purpose of illustration, has been shown as comprising a turnbuckle arrangement. The other end of said adjustable connection or turnbuckle is connected to the end of the scarfing oxygen valve lever 6. When said lever 6 is depressed to open the valve supplying the pure oxygen to the main passage 5, for scarfing the surface defects of the material being treated, the fuel gas being supplied through said ports 7, for the preheating treatment of the surface of the material to be scarfed, is substantially shut off. Only a sufficient quantity of the fuel gas is permitted to pass through the supply pipe for the purposes of maintaining a pilot flame. When the supply of pure oxygen is shut off, preparatory to making another cut in the metal, the lever 6 is released and, due to a conventional design of spring action (not shown) is returned to its original position. In so doing, the valve within the valve mechanism 11 is opened to reestablish the supply of fuel gas to the burner tip and restore the preheating flame at the torch tip ready for the next cut.

The valve 11 is positioned rearwardly of the handle 4 and substantially in alinement therewith. Also, the adjustable linkage 15 is disposed rearwardly of the handle, whereby said valve and linkage comprise virtually a simple extension of the torch proper without interfering projection and without rendering the assembly bulky and unwieldy. Further, the disposition of the valve

and its connection with the torch proper does not destroy the balance of the assembly.

Secured, in any conventional manner, upon the end of the burner tip 3 is a fitting 16 having an extension 17 formed thereon, which extension is provided with a central opening 18 to which is connected a pipe 19. A distributing chamber 20 is provided within the interior portion of said fitting 16, which distributing chamber surrounds the outer periphery of the burner tip 3. A plurality of equally spaced channelways 21 are formed upon the inner periphery of the fitting 16 so that said channelways 21 extend from the end of said fitting inwardly to the distributing chamber 20 in order to establish communication between said distributing chamber and the end of the fitting 16. The end of said fitting 16 is provided with a hardened steel wearing ring 22.

The other end of said pipe 19 is connected, in any conventional manner, to a compressed air supply line 23. A clamp 24 is secured to the handle 4 of the torch and supports, in any conventional manner, a compressed air valve regulating mechanism of conventional design and generally indicated at 25. This compressed valve controlling mechanism includes a lever 26 for opening and closing the valve to supply compressed air through the pipe 19 into the opening 18 for circulation around the distributing chamber 20. The distributed compressed air passes through the respective circumferentially spaced channelways 21 to the end of the fitting.

Upon depressing the lever 26, compressed air will pass outwardly through the channelways 21 and, in so doing, provides an encircling envelope or stream of high velocity compressed air around the central jet of pure oxygen. This action serves the purpose of mechanically blowing the molten "wash" metal clear of the cut and off of the body of metal being treated and further assists in oxidizing this "wash" metal as it is blown away. By directing the enveloping jet of high velocity compressed air around the central jet of pure oxygen, the pure oxygen is confined to the furrow or cut being made, prevents the formation of a "wash" or fin at the sides of the furrow and reduces any tendency of the pure oxygen to flare out and waste to the atmosphere.

Under the present invention, there is provided a torch in which there is a reduction of the heat generated in the scarfing operation, after the preheat period, which will reduce damage to the steel and permit the operator to work at close range. This heat reduction is the result of the automatic control of the supply of fuel gas to the extent that it is reduced to proportions for a pilot flame only during the period in which the scarfing oxygen is in operation. Furthermore, provision is made for more effectively controlling and directing the main oxygen stream used for the scarfing operation, which prevents formation of the usual "wash" or fin at the sides of the furrow and reduces any tendency of the oxygen to flare out and waste to the atmosphere.

While I have shown and described a specific embodiment of the present invention, it will be seen that I do not wish to be limited exactly thereto, since various modifications may be made without departing from the scope of the invention, as defined by the following claim.

I claim:

A scarfing torch or the like having a handle, a valve, a lever at the handle for actuating the valve controlling the flow of oxygen to the torch, a fuel gas connection for the torch, a separate valve between the connection and torch handle for controlling the supply of fuel gas thereto, said fuel valve being disposed substantially in alinement with the torch rearwardly of the said handle, a lever arm carried by the fuel valve for actuating said valve, an adjustable linkage rearwardly of the handle between said oxygen valve lever and the valve lever arm for related movement thereof, said linkage being adjustable for controlling said movement to reduce the fuel gas supply while the oxygen lever is moved to supply oxygen to the torch.

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